CALFED

TECHNICAL REPORT
AFFECTED ENVIRONMENT

SUPPLEMENT TO FISHERIES & AQUATIC RESOURCES

DRAFT

March 1998



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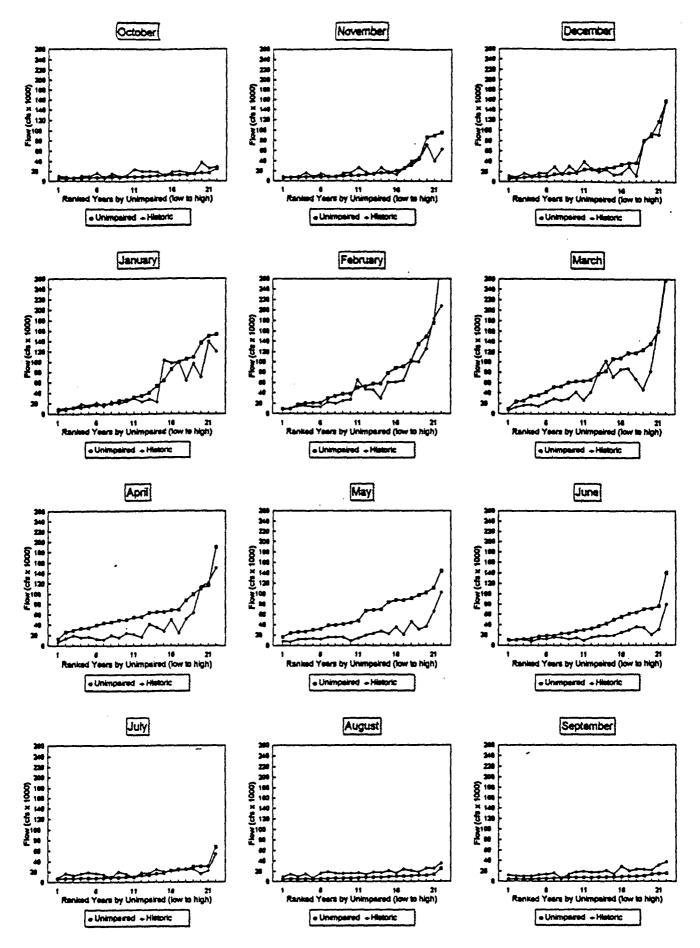
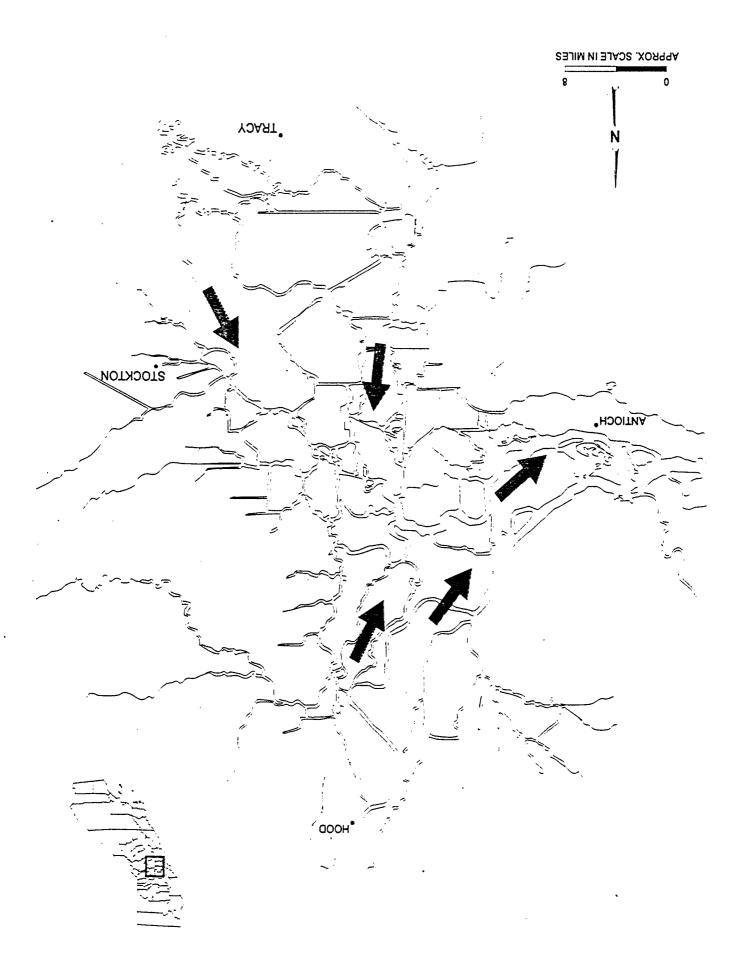


Figure S-1. Delta Inflow under Unimpaired and Historical Conditions (1972-1993)

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Net Flow Direction in Delta Channels Without Diversions and Export Figure S-2.

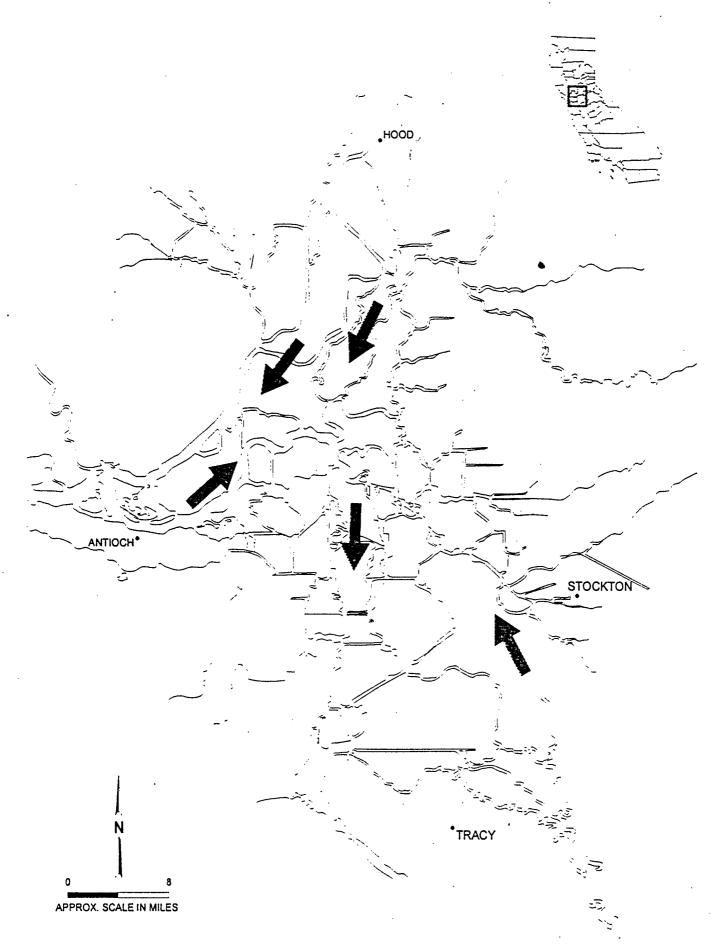


Figure S-3. Net Flow Direction in Delta Channels with Existing Diversions and Export under Low Flow Conditions

S-3

CALFED Bay-Delta Program
SUPPLEMENT to Affected Environment Technical Report

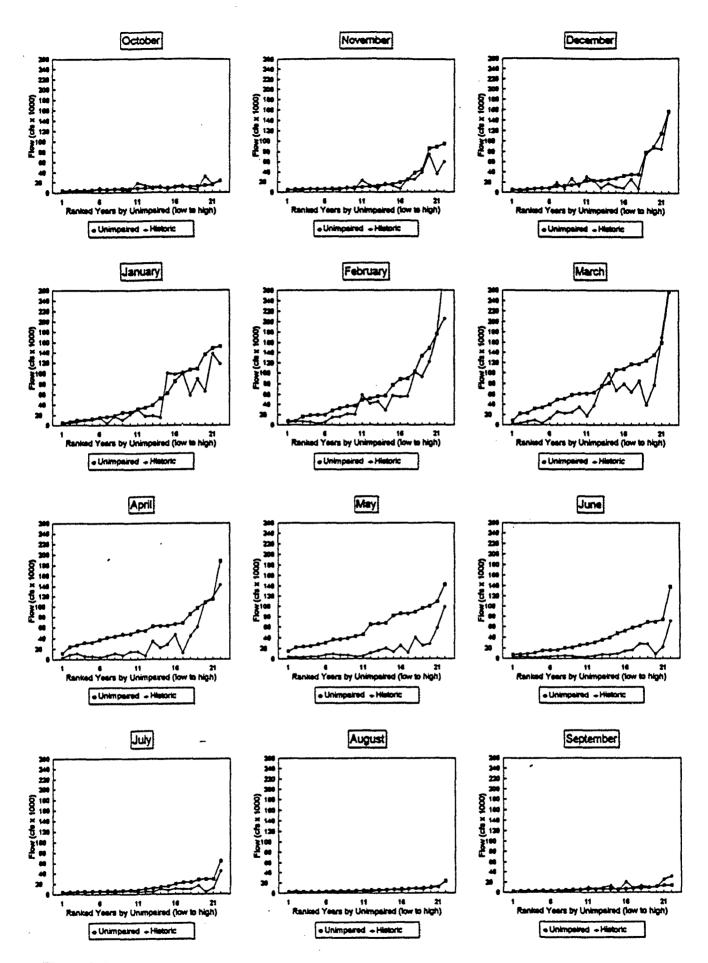


Figure S-4. Delta Outflow under Unimpaired and Historical Conditions (1972-1993)

FISHERIES & AQUATIC RESOURCES

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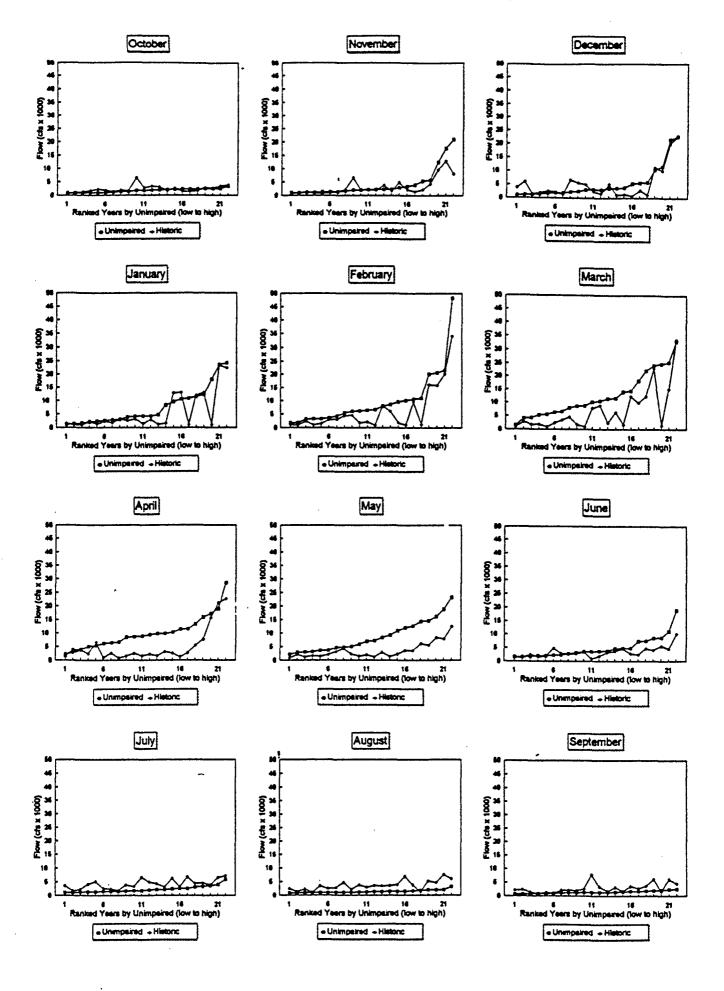


Figure S-5. Feather River Flow under Unimpaired and Historical Conditions (1972-1993)

Rivers	Description
Sacramento River Region	
Sacramento River	Keswick Dam downstream to Freeport
Clear Creek	Whiskeytown Dam downstream to the confluence with the Sacramento River
Minor Tributaries	Battle, Cow, Cottonwood, Paynes, Antelope, Mill, Deer, Elder, Thomes, Big Chico, Stony, and Butte Creeks; other tributaries, including intermittent streams
Feather River	Thermalito Dam downstream to the confluence with the Sacramento River
Yuba River	Englebright Lake downstream to the confluence with the Feather River
Bear River	Camp Far West Reservoir downstream to the confluence with the Feather River
American River	Nimbus Dam downstream to the confluence with the Sacramento River
San Joaquin River Regio	n ·
Mokelumne River	Camanche Reservoir downstream to the Sacramento-San Joaquin Delta; including the Cosumnes River and other tributaries
Calaveras River	New Hogan Lake downstream to the Sacramento-San Joaquin Delta
Stanislaus River	Goodwin Dam downstream to the confluence with the San Joaquin River
Tuolumne River	La Grange Dame downstream to the confluence with the San Joaquin River
Merced River	Crocker-Huffman Dam downstream to the confluence with the San Joaquin River
San Joaquin River	Friant Dam downstream to Vernalis

Table S-1. Rivers in the Sacramento River and San Joaquin River Regions

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Reservoirs	Primary Water Source
Sacramento River Region	
Whiskeytown Lake	Trinity River (out of basin diversion) and Clear Creek
Shasta Lake	Sacramento River
Lake Oroville	Feather River
Bullards Bar Reservoir	Yuba River
Camp Far West Reservoir	Bear River
Folsom Lake	American River
San Joaquin River Region	
Camanche Lake	Mokelumne River
New Hogan Lake	Calaveras River
New Melones Reservoir	Stanislaus River
New Don Pedro Reservoir	Tuolumne River
Lake McClure	Merced River
San Luis Reservoir	Sacramento-San Joaquin Delta Diversion
Other Reservoirs	CALFED actions for new storage

Table S-2. Reservoirs in the Sacramento River and San Joaquin River Regions

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Table S-3. Geographic and Monthly Occurrence of Steelhead by Life Stage in the Sacramento-San Joaquin River System

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				Adult Migration	
	0	0		Spawning/Incubation	
	•	0		Larval Rearing	April
	•	0	0	Juvenile/Adult Rearing	_
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				Adult Migration	
	•	0	•	Spawning/Incubation	
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Table S-4. Geographic and Monthly Occurrence of Striped Bass by Life Stage in the Sacramento-San Joaquin River System

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Table S-5. Geographic and Monthly Occurrence of Fall-Run Chinook Salmon by Life Stage in the Sacramento-San Joaquin River System

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Table S-6. Geographic and Monthly Occurrence of Late-Fall-Run Chinook Salmon by Life Stage in the Sacramento-San Joaquin River System

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Table S-7. Geographic and Monthly Occurrence of Spring-Run Chinook Salmon by Life Stage in the Sacramento-San Joaquin River System

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October	Jurealle Rearing		-	<u> </u>	-				-			-			-	 Indicates primary occurrence Indicates minor or potential occurrence
-	Fry Rearing.	0				<u> </u>	_	-	-	0	-					• 0
	Watershed Compartment	Sicramento River	Clear Creek	Minor Tributaries	Feather River	Yuba River	Bear River	American River	Mokelunine River	Calaveras River	Stanislaus River	Fuolumne River	Merced River	San Joaquin River	Bay-Delta	1 EGEND:
		Á	<u> </u>	ĮŽ	1 25	7	13.0	Į	ĮŽ	3	 	=	Ž	<u>,7</u>	<u> </u>	

Table S-8. Geographic and Monthly Occurrence of Winter-Run Chinook Salmon by Life Stage in the Sacramento-San Joaquin River System

	г			 i	i			
를 <u>-</u>	१०० स्थाद अग्रह्मारक	<u> </u>			-			
-	Junanie Adult Resning					•		
AuguA 	nousing Microut	0	0			•		
<u> </u>	gainesÆ ilubA:slinevut					•		
July —	त्राधायुक्ति आस्त्र स्पर्	•	0	0	0	•		
<u> </u>	Juven:le Adult Resung	0	0			•		
June —	noinnigité Hirmout	•	0	0	0	•		
-	gamas Aubh slinavut.	0	0			•		
	noissigité slins rut	•	0	0	0	•		
	Jurenie Adult Resnng	•	0	0	0	•		
Σ 	<u>बुगोफा</u> नी <i>करा</i> क्ती	0	0					
	Spawning Incubation	0	0					
	noimigité :fubA	0	0			•		
	noining Magnation	•	0	0	0	•		
	Juvenile'Adult Resing	•	0	0	0	•		
April	gnineA lavad	•	0	0	0			
_	noimdwafigninwnq2	•	0	0	0			
_	noimagitA tlubA	•	0	0	0	•		
	nonangiM: slinavul	•	0	0	0	•		
	Jurenile Adult Reanng	•	0	0	0	•		
March	garine R caring	•	0	0	0			
Z	Spawming Incubation	•	0	0	0			
_	normark flubA	•	0	0	0	•		
	noimgilA slinerut	0	0	0	0	0		
-	grinesA ilubA'əlinəvu!.		0	0	0	•		•
Febdary 	Laval Rening	0	0	0	0			
<u> </u>	noimdwafi gaiaweq2	0	0	0	0		,	
_	nottengeld slubA	•	0	0	0	•		urren
in.	garassA slubA slimovul	\vdash		ļ		•		 Indicates primary occurrence. Indicates primary occurrence.
3	Juvenile'Adult Rearing	\vdash	\vdash			•		prima
<u> </u>	Juvenile Adult Reanng		I^-			•		Calles
Oct Nov Dec Jan	Jureal Reanng	\vdash	\vdash			•		- Indi
	Watershed Compartment	Secramento River	Feather River	Merced River	San Josephin River	Bay-Delta	LEGEND:	

Table S-9. Geographic and Monthly Occurrence of White Sturgeon by Life Stage in the Sacramento-San Joaquin River System

		r	r		r	1			
- Ķ	aousigild siins rul	•	•					•	
	Junewise Adult Resmng	•	•					•	
<u>-</u>	Juvenile Migration	•	•		<u> </u>		<u> </u>	0	
August	Jureaile Adult Rearing	•	•					•	
<u> </u>	Jannash Kerasia	0	0	0	0	0	0	0	
_	Jus enite Migration								
_	Juneanie Adult Regrap	•	•			<u> </u>		•	
Jely -	garnes à la cast.	•	•	•	•	٥	0	•	
_	урандийт, Ілемовіноп Срамдійть Вистраноп	•	•	•	•	0	0	0	
	nonmyth flubA	0	0	0	0	0	0	0	
_	noisraile Mugazion		•		<u> </u>			<u> </u>	
l.,	Jurenile Adult Reunng	•	•					•	
June	युगरका में किरकरी	•	•	•	•	0	0	•	
_	noizedwant griawsq2	•	•	•	•	0	0	•	
	notwigild slubA	•	•	•	•	0	0		
_ ا	nountgibl slinsvut		0						
_	garasa RiubA slimavut	0	0					0	
ή - Σ -	पुरायकारी किरमान	•	•	•	•	0	0	•	
_	2 раминий, зистранов	•	•	•	•	0	0	•	
	notisigeM HubA	•	•	•	•	0	0	•	
	normile Migration								
	Juvenile'Adult Rewing							0	
April	दुवास्त्रज्ञ मिल्या								
]]	Spawningfinoibation								,
	noimagité ilubA	•	•	•	•	0	0	•	
	hyvenile Migration								
March -	Junearile Adult Reanng							0	
_	ពលនេះឬវេភ វបែងA :	0	0	0	0	0	0	•	
2	normaild slineval								
February	gaines A tlub A'stinsvut							0	<u> સુ</u>
Ξ -	noirsigiM tlubA							0	וויכו
<u> </u>	nousraité blimaeut							0	33
	garas A dult Reanng							0	renc
یز	nomagiz4 slimarul	0	0					0	ceur
ತ್ತ -	Juvenile'Adult Rearing	0	0					0	0 j
>	Juvenile Migration	•	•	†		 		•	# Indicates primary occurrence # Indicates minor or potential occurrence
Š -	Juvenile Adult Resnng	•	•			 	 	•	8 8
	notergitA slineval	•	•			\Box		•	dicat
ਨ ਹ	Juvenile'Adult Rearing	•	•					•	
	Watershed	Sacramento River	Feather River	Yuba River	American River	Mokelunne River	Stanislaus River	Bay-Delta	LEGEND:
		.X.	5	Z.	Ę	3	N. N.	± 1	

Table S-10. Geographic and Monthly Occurrence of American Shad by Life Stage in the Sacramento-San Joaquin River System

Krp1	Juvenie Adul: Resing	•	
ب <i>ز</i> د	2 рамину диспратов		
August	gaines A dult Rening	•	
7	Spawning Incobation		
	Juvenile Adult Reanng ,	•	
July	டகரக) இன்றத	0	
L	рьямині є дрепрянов	0	
	garisəA ilubA əlinəvut	•	
July 3	gaines A terne I	•	
	noimdwning Increment	0	
	Jureall Adult Reanng	•	
May	निकार प्रस्थापक	•	
	nousdwafi gainwaq2	•	
	gaines Rearing	•	
April	Larval Retring	•	
	SpawningAncubation	•	}
_	gnines Rearing	•	
March	वृत्तांका में कि ग्रह्म	•	
	noisedwarf grammeq2	•	
\ \hat{\sigma}	Juvenile Adult Rearing	•	
February	gninss R lavne.1	0	
4	noisedsonf grimmeq2	0	
_	gnines R slubs alinavul	•	
JERUM	वुतांगक्षत्री किनाहरी	0	
ſ	поіваьти дліпивад	0	ပ
5	Juvenile'Adult Resring	•	nerene
December	द्वातक्षत्र विश्वा		nce.
ď	понядью учет предпасти	0	currer
<u>}</u>	Juvenile Adult Rewing	•	ary oc
Nev	Spawning/Incubation	0	prink
ber	Juvenile'Adult Reanng	•	- Indicates primary occurrence - Indicates minor or potential o
October	noisedwall-grimmeq2		 Indicates primary occurrence. Indicates minor or potential occurrence.
	Watershed Compariment	Bay-Delta	O •

Table S-11. Geographic and Monthly Occurrence of Delta Smelt by Life Stage in the Sacramento-San Joaquin River System

	· -		
LEGIEND.	Bay-Delta	Watershed Compartment	
; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;		Spawning/Incubation	
Indicates primary occurrence. Indicates minor or potential occurrence		Juvenile/Adult Rearing	Oct
s prim	0	Spawning Incubation	z
ay or		Juvenile'Adult Rearing	Nov
otenti	0	Spawning/Incubation	=
nce.	0	Larval Rearing	December
micne	0	Juvenile Adult Rearing	ŭ
, e	0	Spawning/Incubation	_
	0	Larve - Reaning	January
	•	Juvenile/Adult Rearing	Ų
	•	Spawning/Incubation	
	•	Larval Rearing Juvenile'Adult Rearing	
	•		
	•	Spawning Incubation	March
	•	Larval Rearing	
	•	Juvenile/Adult Rearing	_
	•	Spawning/Incubation	
	•	Larval Rearing	April
	•	Juvenile/Adult Rewing	'
	0	Spawning/Incubation	
	•	Larval Rearing	May
	•	Juvenile/Adult Rearing	
	0	Spewning/Incubation	
	0	Larval Rearing	June
	•	Juvenile Adult Reanng	
		Spawning Incubation	
		Lava! Reanng	July
	0	Juvenile Adult Rearing	
		Spewning/Incubation	August
		Juvenile/Adult Resting	7
		Spawning Incubation	S.
		Juvenije Adult Keating	<u> </u>

Table S-12. Geographic and Monthly Occurrence of Longfin Smelt by Life Stage in the Sacramento-San Joaquin River System

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ΞX	inserior Migration	i		2	
	geras A slub A seerag			•	
August	accargeM slinevol	0	0	•	
٧	garasA tlubA slimvut			•	
	totangile Migration	•	•	•	
July	Juneanit Adult Keenng	•	•	•	
3	gensa Alexas.d	0	0	0	
	างเวลสนอณ์" ยูกเกพลดุ 2	၁	ာ	0	
	Juvenile Migration	•	•	•	
June	gamaA slubA'alimvut	•	•	•	
~	Zariss A larval.	0	0	0	
	Spawning/Incubation	0	0	0	
	Juvenile Migrator.	•	•	•	
	garasi A ilubik aliasirut	•	•	•	
May	्राध्या श्रद्धा ण्ड	•	•	•	
Z	nousdworf gain waq2.	•	•	•	
	noturigiM ilubA	0	0	0	
	noisergil Alianvut	•	•	•	
	Juvenile'Adult Rearing	•	•	•	
April	Laral Rearing	•	•	•	
۲	Spewing/Incubation	•	•	•	
	Adult Migration	•	•	•	
	Juvenile Migration	0	0	0	
March	Juvenile Adult Resnng	•	•	•	
	Larval Rearing	•	•	•	
Z	Σρενπίης/Ιπαυδείτου	•	•	•	
	Adult Migration	•	•	•	
	noisegiM slinsvut				
	Juvenile Adult Rearing	0	0	•	
February	Lerval Rearing	0	0	0	
Feb	2ректіпЕ/Іпольшіоп	•	•	•	
	Adult Migration	•	•	•	
H	notargité slinavul	H	-	<u> </u>	
≥	garas A tlub A silravut		-	•	
January	Sparming Incubation	0	0	0	
<u> </u>	Adult Migration	-	-	•	365
-	anistigate Migration	<u> </u>	-		1 3
ž	Juvenile Adult Renng	\vdash	-		ince.
December		├—	├-	-	, curr
ದೆ	Spawning Incubation	-		-	, x
<u> </u>	noiseast AubA	-		-	inari)
Nev	Juvenile Adult Reanng	<u> </u>		-	
	noitergilA rlubA	 		-	3 3
DG G	Juvenile'Adult Rearing		 		 Indicates primary occurrence. Indicates minor or potential occurrence.
F	aonargitá flubA		-	_	
	Watershed	Sacramento River	San Joaquin River	Bay -Delta	LEGEND:

Geographic and Monthly Occurrence of Sacramento Spittail by Life Stage in the Table S-13. Sacramento-San Joaquin River System

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FISHERIES & AQUATIC RESOURCES

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